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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/544,822	04/06/2000	Tongbi Jiang	4241US	9308
7590 10/09/2003			EXAMINER	
James R Duzan Trask Britt & Rossa P O Box 2550 Salt Lake City, UT 84110			GRAYBILL, DAVID E	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/544,822	JIANG, TONGBI	
	Examiner	Art Unit	
	David E Graybill	2827	

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-32 and 58-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-32 and 58-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

In the rejections infra, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 5, 7, 9-12, 15, 22 and 58-60 rejected under 35 U.S.C. 103(a) as being unpatentable over Dery (6074895) and Higgins (5492863).

At column 1, lines 51-62; column 2, line 52 to column 5, line 11; column 5, lines 51-59; and column 6, lines 13-54, Dery teaches the following:

A method for applying a material between a semiconductor device having a surface and a substrate having a surface, said method comprising: applying a liquid wetting agent layer 111, 124 [before or after plasma treatment] to one of said surface of said semiconductor device 110 and said surface of said substrate 120; and applying a flowable material 140 between the substrate and the semiconductor device, wherein said semiconductor device

is attached to said substrate, wherein said applying said liquid wetting agent layer comprises any one of a dispensing method, a brushing method, and a spraying method, wherein said liquid wetting agent layer comprises at least one layer, wherein said liquid wetting agent layer comprises a plurality of layers, and wherein said applying said liquid wetting agent layer comprises providing a material for increasing the surface tension to one of said surface of said semiconductor device and said surface of said substrate for the application of an underfill material.

A method for applying a material between a semiconductor device and a substrate, said method comprising: providing a semiconductor device having an active surface, another surface, a first end, a second end, a first lateral side, and a second lateral side ["all four sides"], said first end, said second end, said first lateral side, and said second lateral side forming at least a portion of a periphery of said semiconductor device; providing a substrate having an upper surface, a first side wall, a second side wall, a first lateral side wall and a second lateral side wall; applying a liquid wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate; and applying a flowable material between said semiconductor device and said substrate, wherein said flowable material is applied substantially adjacent

to at least one end of said semiconductor device, wherein said flowable material substantially fills a gap between said semiconductor device and said substrate, wherein said flowable material is provided substantially adjacent to said at least a portion of the periphery of said semiconductor device to fill a gap between said substrate and said semiconductor device, and wherein said applying said flowable material comprises: providing said flowable material substantially adjacent said first end ["one or more edges" of said semiconductor device for filling between said substrate and said semiconductor device by one or more forces acting upon said flowable material.

A method for attaching a semiconductor assembly, said method comprising: providing a semiconductor device having an active surface; providing a substrate having an upper surface; applying a liquid wetting agent layer to one of said active surface of said semiconductor device and said upper surface of said substrate; connecting said semiconductor device to said substrate so that said active surface of said semiconductor device faces said upper surface of said substrate; and applying an underfill material between the substrate and the semiconductor device, wherein applying said liquid wetting agent layer comprises any one of a dispensing method, a brushing

method, and a spraying method, and wherein said liquid wetting agent layer comprises at least one layer.

However, Dery does not appear to explicitly teach applying a liquid wetting agent layer.

Nonetheless, as cited, Dery teaches that the wetting agent layer is an epoxy resin solder mask and polyimide. In addition, at column line 59 to column 5, line 7, and column 5, line 54 to column 6, line 3, Higgins teaches application of a liquid epoxy resin solder mask and polyimide. Moreover, it would have been obvious to combine the process of Higgins with the process of Dery because it would enable application of the wetting agent layer of Dery.

To further clarify the teaching wherein said applying said liquid wetting agent layer comprises any one of a dispensing method, a brushing method, and a spraying method, it is noted that it is inherent in the process that the layer is dealt out in portions; therefore, it is inherent that the layer is dispensed.

In any case, as cited, Higgins teaches application of liquid epoxy resin solder mask and polyimide using a dispensing and a spraying method, and it would have been obvious to combine the process of Higgins with the process of Dery because it would enable application of the wetting agent layer of Dery.

Claims 3, 8 and 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dery and Higgins as applied to claims 1, 2, 4, 5, 7, 9-12, 15, 22 and 58-60 and further in combination with Plueddemann (4231910).

Dery and Higgins do not appear to explicitly teach the following:

The method wherein said liquid wetting agent layer includes a layer of silane-based material, wherein said liquid wetting agent layer comprises one of glycidoxypropyltrimethoxysilane and ethyltrimethoxysilane, and wherein said liquid wetting agent layer comprises one of silane, glycidoxypropyltrimethoxysilane, and ethyltrimethoxysilane.

A method for attaching a semiconductor assembly, said method comprising: applying a silane-based material layer to one of a portion of said active surface of said semiconductor device and a portion of said upper surface of said substrate, wherein said liquid wetting agent layer comprises one of glycidoxypropyltrimethoxysilane and ethyltrimethoxysilane.

Nonetheless, at column 1, lines 5-8, 21-23 and 55-63; column 2, lines 5-49; column 3, lines 22-54; column 3, line 65 to column 4, line 10; column 4, lines 24-27 and 58-62; and column 7, line 4 to column 8, line 5, Plueddemann teaches

wherein a liquid wetting agent layer comprises one of glycidoxypropyltrimethoxysilane and ethyltrimethoxysilane.

In addition, it would have been obvious to combine the process of Plueddemann with the process of Dery and Higgins because both Plueddemann and Dery are drawn to improving adhesion of a plastic, and the process of Plueddemann would improve the adhesion of the plastic of Dery.

In addition, it has been held that it is obvious to combine two processes for the same purpose. In re Novak 16 USPQ2d 2043. Similarly, "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 205 USPQ 1069, 1072 (CCPA 1980) (citations omitted) (Claims to a process of preparing a spray - dried detergent by mixing together two conventional spray - dried detergents were held to be prima facie obvious.). See also, In re Crockett, 279 F.2d 274, 126 USPQ 186 (CCPA 1960) (Claims directed to a method and material for treating cast iron using a mixture comprising calcium carbide and magnesium oxide were held unpatentable over prior art disclosures that the aforementioned components

individually promote the formation of a nodular structure in cast iron.); and Ex parte Quadranti 25 USPQ2d 1071 (Bd. Pat. App. & Inter. 1992) (Mixture of two known herbicides held prima facie obvious).

Claims 13, 14, 16-21, and 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dery and Higgins as applied to claims 1, 2, 4, 5, 7, 9-12, 15, 22 and 58-60 supra, and further in combination with Akram (5766982).

Dery and Higgins do not appear to explicitly teach the following:

The method wherein said substrate includes an aperture extending through said substrate, wherein said aperture is located adjacent to said another surface of said semiconductor device, further comprising: elevating at least said first side wall of said substrate and said first end of said semiconductor device, wherein said elevating said first side wall of said substrate comprises placing said substrate on a support structure and elevating at least one portion of said support structure, further comprising: providing a dam on the substrate adjacent to at least one of said first end, said second end, said first lateral side and said second lateral side of said semiconductor device, wherein said dam extends to substantially between said semiconductor device and said substrate, further

comprising: vibrating one of said semiconductor device and said substrate, wherein said vibrating one of said semiconductor device and said substrate comprises placing said substrate on a support structure and vibrating said support structure, wherein said substrate includes at least one aperture extending through said substrate and substantially located adjacent to said another surface of said semiconductor device, wherein said flowable material is provided through said at least one aperture of said substrate substantially filling a gap between said substrate and said semiconductor device, wherein said substrate includes at least one aperture extending therethrough and substantially located adjacent to said another surface of said semiconductor device, wherein said flowable material is provided from below said substrate, and wherein said flowable material is provided through said at least one aperture contacting at least a portion of said another surface of said semiconductor device.

Nevertheless, at column 4, line 36 to column 7, line 17, Akram teaches a process wherein a substrate 10 includes an aperture extending through a substrate, an aperture 60 is located adjacent [nearby] to another surface of a semiconductor device 12; elevating at least a first side wall of the substrate and a first end of the semiconductor device, wherein elevating a first side wall of the substrate comprises placing the substrate

on a support structure 44 and elevating at least one portion of a support structure; providing a dam 40 on the substrate adjacent to at least one of a first end, a second end, a first lateral side and a second lateral side of a semiconductor device, wherein a dam extends to substantially between a semiconductor device and a substrate; vibrating 48 one of a semiconductor device and a substrate, wherein vibrating one of a semiconductor device and a substrate comprises placing a substrate on a support structure and vibrating a support structure, wherein a flowable material 28 is provided through at least one aperture of a substrate substantially filling a gap 26 between a substrate and a semiconductor device, and wherein a flowable material is provided through a at least one aperture contacting [at least indirect physical contact and thermal contact] at least a portion of another surface of a semiconductor device.

Moreover, it would have been obvious to combine the process of Akram with the process of Dery and Higgins because it would facilitate applying the flowable material 140 between the substrate and the semiconductor device.

Also, in the combination, Dery teaches the following:

The method wherein a applying a flowable material comprises: providing a flowable material substantially adjacent

to a first end of a semiconductor device for filling a gap between a substrate and a semiconductor device, wherein said applying said flowable material comprises: providing said flowable material substantially adjacent to said first end and one of said first lateral side and said second lateral side of said semiconductor device for filling a gap between said substrate and said semiconductor device, and wherein a flowable material is provided from below a substrate.

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dery and Higgins as applied to claims 1, 2, 4, 5, 7, 9-12, 15, 22 and 58-60 supra, and further in combination with Banerji (5203076).

Dery and Higgins do not appear to explicitly teach the following:

The method wherein said applying said flowable material between said semiconductor device and said substrate further comprises placing said semiconductor device and said substrate in a chamber, said chamber having an atmosphere therein having a variable pressure, further comprising: varying the pressure of said atmosphere in said chamber for said flowable material substantially filling a gap between said semiconductor device and said substrate.

Regardless, at column 2, lines 55-68, and column 3, lines 1-10, Banerji teaches a process wherein applying a flowable material 22 between a semiconductor device 10 and a substrate 20 comprises placing the semiconductor device and the substrate in a chamber 32 having an atmosphere therein having a variable pressure, and varying the pressure of the atmosphere in the chamber for the flowable material substantially filling a gap 18 between the semiconductor device and the substrate.

Furthermore, it would have been obvious to combine the process of Banerji with the process of Dery because it would facilitate applying the flowable material 140 between the substrate and the semiconductor device.

Applicant's amendment and remarks filed 4-1-3 have been fully considered, and are addressed supra and infra, or have previously been adequately addressed in the record.

Applicant argues that Dery and Plueddemann are nonanalogous art.

This argument is respectfully traversed because it has been held that a prior art reference must either be in the field of applicant's endeavor or, if it is not, then it must be reasonably pertinent to the particular problem with which applicant was concerned in order to be relied upon as a basis for rejection of the claimed invention. In re Oetiker, 977

F.2d 1443, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). In this case, both Dery and Plueddemann are in the field of applicant's endeavor and reasonably pertinent to the particular problem with which applicant is concerned; namely, the improvement of adhesion of plastic layers.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

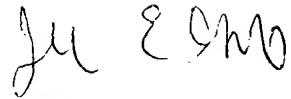
Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to Group 2800 Customer Service whose telephone number is 703-306-3329.

Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

The fax phone number for group 2800 is (703) 872-9306.

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A handwritten signature in black ink, appearing to read "David E. Graybill".

David E. Graybill
Primary Examiner
Art Unit 2827

D.G.
29-Sep-03